Minutes of the Gulf of Alaska Groundfish Plan Team

North Pacific Fishery Management Council
605 W 4th Avenue, Suite 306
Anchorage, AK 99501

Held at
Alaska Fishery Science Center
Seattle WA

The Gulf of Alaska Team convened on Monday, Nov 17th 2014 at 3pm through the 21st. Writing/rapporteur assignments were provided for the afternoon and the remaining list to be distributed later that day.

GOA Ecosystem Considerations

Stephani Zador presented the Gulf of Alaska Ecosystem Considerations Report. This year's version contains 50 Ecosystem Status and Management Indicators. A new Gulf of Alaska ecosystem assessment following the procedure and format of the Eastern Bering Sea and Aleutian Island assessments, has been delayed due to unanticipated Paperwork Reduction Act approval processing time.

The "hot topic" feature of the presentation this year was the "Warm Blob", or the area of abnormally high sea water temperatures in the Gulf of Alaska. In addition, seabird reproduction in the western Gulf was abnormally successful. Birds nested earlier in the year which led to good survival of the offspring possibly due to favorable winter pre-conditioning or summer foraging. Murres in the eastern Gulf had less success with these parameters.

There is evidence that the state of the ecosystem may have changed in 2006. These include: 1) salmon, halibut, arrowtooth flounder and shrimp PCA indicator changes after this year, 2) Southeast Alaska (SEAK) pink salmon odd year strong year class pattern, 3) SEAK herring reached a historical abundance in 2005 (and has been higher), 4) the percent by number of sand lance that are delivered to puffin chicks changes direction in Principal Components Analysis (PCA) in 2005 and beyond, 5) there is a shift to more cold pattern in the GOA after this time, 6) changes in PDO (shift to negative in 2006), 7) changes in North Pacific Gyre Oscillation (shift to positive in 2006), 8) the Papa trajectory index endpoint latitude exhibits a drop in latitude during 2000-2009, and 9) there has been a decline in total biomass since 2007 recorded in the ADF&G GOA trawl survey.

A PCA of temporal variability of sand lance in the diet of puffins provisioning chicks was presented. The first Principal Component (PC1) reflected interannual variability in sand lance in the central and western GOA, PC2 reflected sand lance in the central and western GOA, and PC3 reflected environmental variability, particularly annual SST. Sand lance captured by puffins show that sand lance were most prevalent from the mid-1990s to the mid-2000s in the central and western GOA. In contrast, sand lance were most prevalent in the mid-1990s and have been decreasing since in the eastern GOA.

Salmon and groundfish indices were also presented. The total number of salmon harvested in 2013 was the largest going back to 1962 and twice the values from 2012. However, ecosystem indicators predict a low pink salmon harvest in 2014. Notable among groundfish was that there were no reports of mushy halibut in 2013 and 2014; this is a condition that is considered a result of nutritional myopathy/deficiency. New to this year is an index of groundfish condition factors, which are derived from length and weight relationships during the NMFS surveys. The Plan Team thought that the time it takes to complete the survey, combined with the movement of the survey from south to north could explain observed patterns in this index.

Other Plan Team discussions

The presenter brought up a possible NPRB proposal to coordinate 2015 survey efforts in the GOA with efforts in the California Current Ecosystem and in waters off British Columbia to provide a synoptic view of the impacts of the warm blob which is expected to continue into 2015. The goal of the project is to identify which species move deeper, which move north/south, and which species stay in the presence of the warm pool that provides an acute natural experiment simulating chronic environmental conditions. The Plan Team supported the development of this proposal.

GOA Pollock

Kresimir Williams presented his research on the use of "pocket nets" to evaluate escapement from survey trawl nets. The trawl data are used to convert acoustic backscatter to length frequency values. This study is important because if there are length-specific patterns in escapement, the length frequency of fish retained in the net could be biased. Experiments were conducted in 2007 on the NOAA ship Miller Freeman and in 2008 and 2013 on the NOAA ship R/V Oscar Dyson. They found a vessel effect with poor retention of age-1 pollock and possibly age-2 on the R/V Miller Freeman and improved retention on the R/V Oscar Dyson. However retention of age-1 pollock by the R/V Oscar Dyson was less than 100%, indicating that a correction was still needed for net selectivity. Their experiments resulted in a corrected time series for the biomass index and the age-composition estimates from 1993 to the present. The Team asked if there were plans to continue the study, and Kresimir responded that it depends on funding and feedback. The Team noted that the model with the revised data (Model 10) used the same CV for the index as was used in the other models (e.g., Model 9).

Martin Dorn presented a summary of this year's assessment. New data include the 2014 Shelikof Strait biomass, the 2014 ADFG survey biomass, and the 2013 summer acoustic survey relative index. The summer acoustic index was not incorporated into the model because a single data point from relative survey index would be uninformative about stock trends. Model changes included: starting in 1970, removing old survey data (as recommended by the CIE review), using a random walk for the changing fishery selectivity parameter, estimating an age-specific natural mortality schedule, and modeling age-1 and age-2 pollock in the winter acoustic survey as separate indices.

Martin then presented the assessment in greater detail. While reviewing and thinning out the data used in the assessment, he also recompiled all of the catch data (including catch at age). The Team discussed the seasonality of the pollock fishery and the extent of targeting pre-spawning pollock historically relative to recent years.

The approach for estimating age-specific natural mortalities was presented. Three estimates were calculated from multispecies models that included GOA pollock and three estimates were calculated from theoretical/empirical methods. All six estimates were averaged, and the average was rescaled so that the average mortality from the age of maturity and older was set equal to 0.3; the value previously used for all ages in the stock assessment. The Team discussed that although this is a big change to the assessment, there were minor differences in the results. Martin noted plans to re-examine time-varying changes in natural mortality as had been done in the late 1990s.

A series of ten models were presented where each involved changes that were evaluated in a stepwise, cumulative manner. Model 10 included the correction for net selectivity, which the author indicated was new and would benefit from further evaluation. Therefore, he recommended Model 9 that included all of the other incremental model changes. The Team agreed with this, but would have preferred to see more diagnostics on the relative trade-offs on goodness of fit for each model.

To help understand the potential impact of the cumulative model changes on management recommendations, the Team requested running last year's model with only the new data added to see the

effect if any on the ABC. The author agreed and provided this to the group during the week. The estimated 2015 ABC for Model 9 was 17% higher than a model with only new data added, but the percent difference in ABC declined to less than 10% by 2017.

The Southeast Alaska assessment was the same as last year. For apportionment, a random effects model was applied by area to the NMFS trawl survey summer biomass distribution. The random effects model performed poorly for the winter acoustic surveys on pollock spawning aggregations due to estimates that were sparse and occasionally very low (due to sampling and survey timing, perhaps). The Team noted that the survey average working group has discussed this and is considering some alternative specifications for default process to observation error ratios (or priors on those ratios).

Based on Model 9 results, the author's recommended ABC for 2015 represents an increase from last year at 191,309 t (for W/C/WYAK region). Spawning biomass is estimated to be slightly below B40% and thus the stock in Tier 3b. The estimated number of mature fish is projected to remain stable over the next five years.

The Team discussed the how to handle the Prince William Sound GHL. In the past, we have deducted it from the ABC in the summary table and the full ABC is only available in the assessment document. However, this gives the impression that ABC has been exceeded when the GHL is added to the federal TAC. Based on guidance from NMFS Regional Office, the Team decided to treat the ABCs in the summary tables similar to what is done for Pacific cod. The State GHL for Pacific cod is deducted from the Western, Central, and Eastern management area ABCs prior to establishing the TACs for those areas.

If the PWS GHL is still equal to 2.5% of W/C/WYAK pollock ABC, then 0.025*191,309=4,783 t =GHL. For the record, values of ABC = 191,309 - 4,783 = 186,526 t would have been the ABC presented in the specifications tables using previous years' approach.

Jan Rumble presented the State of Alaska's plans to open a Commissioner's permit seine fishery for pollock in Cook Inlet starting December 1. There is also a proposal for a similar seine fishery in Prince William Sound. Observers and sampling are mandatory on every trip, so data on catch composition including bycatch species will be collected. The Team looks forward to an update next September. The Team noted that the expected catches of pollock would be relatively small and further discussion was unnecessary, especially given the planned monitoring and reporting to the Teams in future.

The Team recommended that a presentation of the summer 2015 acoustic survey be provided in September with an indication on whether a new data series would be included in November 2015.

GOA Pacific Cod

Teresa A'mar presented three sets of models: Model 1 was identical to the final model configuration from 2013. Model 2 identical to Model 1 but used the recruitment variability multiplier. The two new models (S1a and S1b) also used the recruitment variability multiplier and:

1. treat the bottom trawl survey as a single source of data instead of splitting the sub 27 and 27-plus data for lengths and ages,
2. include survey age data as conditional age-at-length data;
3. instead of incorporating 12 blocks of logistic survey selectivity (Models 1 and 2), Model S1a uses 3 blocks of non-parametric survey selectivity and Model S1b uses cubic spline based survey selectivity.

The Team agreed with the Teresa's proposal to use S1a as the preferred model primarily because it fit the data better than S1b.

Teresa presented results from additional age-composition data (2013 GOA bottom trawl survey) that was provided after the assessment was completed. She noted that when incorporated, these data reduced the

estimated abundance at age (~ 8% of biomass) relative to the selected model in the assessment without the 2013 survey age data.

The Team discussed how this could affect accepting the maximum permissible ABC level. After much deliberation considering a number of alternatives (including rolling over last year's ABC) they concluded that although the model configuration was acceptable, recommending an ABC less than the maximum permissible would be prudent. Therefore, an ABC for 2015 set halfway between the maximum permissible ABC in the assessment and the 2014 ABC would be reasonable for the following reasons:

- Model runs including the 2013 survey age composition resulted in an ABC that was about 10,000 t lower (the data were made available only one day before the Team meetings and hence were unavailable for the assessment).
- Concern over retrospective pattern
- New survey information in 2015 will be available and the 2016 recommendation will be updated

Other comments and discussions led to the following recommendations:

The Team recommended cross checking length composition figures for inconsistency (e.g., data presented in Fig. 2.6 appeared inconsistent with that shown in Fig. 2.17).

The Team recommended examining the longline survey RPN and length frequency data for use within the model.

GOA Shallow Water Flatfish

Jack Turnock presented the non-rock sole components of shallow-water flatfish.

Teresa A'mar presented the Northern and Southern rock sole assessment. The **Team recommended that for 2015 the species composition sampling be weighted not just to the haul level, but also to reflect the total catch and sampling rates within sectors of the fishery**. This may help reduce or explain the high level of variability observed in the ratio of the catches. This should also help explain how comprehensive the observer sampling has been, how many vessels are being sampled from each sector of the fishery, and how the spatial and temporal distribution of the fishery may compare to that of the survey.

The Team noted that the predicted variability of length-at-age, especially for smaller rock sole, appeared to be appreciably higher than in the observed data. **Therefore the Team recommended that adjustment of the Amin value downward should be explored to see if it might alleviate this problem.** Further, there was a pronounced lack of fit to strong modes in some of the survey length data, particularly the male distributions. The Team identified some descending limb selectivity parameters that appeared to be poorly estimated, and **recommended these values be re-estimated in 2015**.

The Team noted that for some flatfish species there is a probable relationship between trawl survey catchability and water temperature. **Therefore, the Team recommended that the authors evaluate similar species and investigate whether this relationship should be considered in the shallow water flatfish assessment and how it might be implemented.**

In 2013, the Team recommended a full assessment for the Tier 5 contribution to the SWF complex including in-depth consideration of relative catch by fishery and survey biomass estimates by area. The executive summary noted that this will be addressed in the next full assessment for SWF in 2015.

In 2013, the Team recommended that an evaluation of relative trends provided ADF&G survey data. The assessment noted that this work is still ongoing.

The Team recommended that the random effects approach to survey biomass smoothing be used for the apportionment calculations in 2015.

GOA Rex sole, Flathead sole, Deepwater, and Dover sole

The Team discussed catch-reporting in summary tables and distinction with end-of-year projections and how best to clarify distinctions. This included discussion of "best estimates" from authors for the current year for use in making recommendations in the subsequent year and a protocol for year to date catches in the summary table as compiled by Teams.

The Team recommends examining the using the random effects model for area apportionment estimation for the 2015 assessments.

Research priorities for this group of flatfish include:

- Use stock synthesis assessment framework to facilitate exploration:
    - Examine survey and fishery selectivity patterns
    - Estimate growth based on more recent data, if possible
    - Account for ageing error
    - Explore data weighting
- Consider using ADF&G small mesh survey data
- Explore ways to better account for uncertainty (e.g. uncertainty in natural mortality and catchability)

GOA Arrowtooth

There were no changes in assessment methodology since this was an off-cycle year. Arrowtooth flounder are managed as a Tier 3a stock, using a statistical age-structured model as the primary assessment tool. The model was used with the same configuration as the 2013 full assessment. Parameter values from the previous year's assessment model and projected total catch for 2014 and updated 2013 catch were used to make projections to recommend ABC and OFL. Projections are based on estimated catches of 39,744 t for the 2014 total catch, and in place of maximum permissible ABC for 2015 and 2016.

The projected age 3+ biomass estimates are essentially unchanged for the current update. Female spawning biomass in 2015 was estimated at 1,957,970 t, which is <1% higher than the projected 2015 biomass from last year's assessment. Age 3+ biomass is expected to decrease in 2016. The 2014 catch of arrowtooth was the highest on record which is partially due to recent changes in regulations (Amendment 95) of the halibut trawl prohibited species catch (PSC) limits. For the Amendment 80 fleet in the GOA, unused halibut PSC limits are now allowed to be rolled from one season to the next, which allows catcher processors to spend more time targeting arrowtooth flounder without constraints due to halibut PSC. In addition, new regulations have moved the deep-water flatfish fishery closure date later in the year for all trawl vessels. These changes will likely result in continued higher arrowtooth flounder catches than previous years, similar to the current year.

The market is improving for arrowtooth flounder. "Arrowshimi" is being marketed successfully from arrowtooth flounder.

The Team recommends that the assessment authors evaluate a range of plus group ages, and start the model at age 1 as is done in the BSAI model.

The Team recommends that the random effects apportionment be presented in 2015 along with the status quo apportionment.

In general, for all flatfish assessments, the Team recommends that new maturity information be evaluated and incorporated as appropriate.

GOA Pacific Ocean Perch

Pete Hulson presented the 2014 assessment of the Pacific Ocean Perch stock in the Gulf of Alaska. Although GOA rockfish assessments are planned for odd years to coincide with the availability of new survey data, a full assessment was conducted in 2014 to present alternative models that incorporate new maturity information. The Team's discussion focused on two topics: 1) the use of length composition data in the assessment model and 2) apportionment methods.

In response to recommendations last year, a sensitivity analysis including/excluding the most recent year's survey length composition was performed (Appendix 9B). The POP assessment uses an age-structured model. However, age composition data from the most recent survey were unavailable in time for this assessment. Length composition data were available and could have been used, but the sensitivity analysis concluded that using most recent survey length composition data as a proxy for the age composition data significantly affects results, with recruitment being overestimated. The question arises of whether the fishery length composition data should also be excluded from the model until the cause of the model sensitivity to including length data can be identified, as both fishery and survey length data are being fit with the same transition matrix that converts modeled ages to lengths.

The Team therefore recommends examining the binning scheme for length data, **the effect of the plus group when computing the aging error matrix and alternative ages for the plus group.**

Also, the Team recommended examining effect of length-stratified otolith sampling (vs. assumption of a random sample) on growth parameters and the transition matrix

The Team noted that this analysis of the relationship between age and length data in the model overlaps with a recommendation from the CIE review to estimate growth inside the model.

Apportionment of POP is split first into Western, Central, and Eastern (W/C/E) areas of the GOA. In addition, the Eastern area is further divided into a West Yakutat (WYAK) and East Yakutat Southeast Outside (EYAK/SEO) area. A random effects model was used for area apportionment in the W/C/E area. Data limitations precluded estimating apportionment for WYAK and EYAK/SEO with the random effects model in time for this assessment. A preliminary analysis of the WYAK- EYAK/SEO split with the random effects model was presented to the Team. The Team agreed with the author's recommendation to use the random effects model for the W/C/E area apportionment and the status quo method for the WYAK-EYAK/SEO split until further analysis using the random effects model for the latter can be completed.

Guidance was requested on the use of the upper 95% confidence interval for the WYAK- EYAK/SEO apportionment. This approach is intended to reduce variability in the apportionment fraction. **The Team recommends examining alternative ways of computing the 95% confidence interval**. The current approach uses confidence intervals for the mean of the ratios from the 3 most recent surveys. An alternative approach could use the random effects model to compute the 95% confidence intervals. **Another recommendation was to analyze catches in each area and examine whether catches were disproportionately large relative to the fishable biomass in each area.**

Other comments:

- Aging of sample otoliths is a constraint for this assessment. Fishery age compositions are typically only available every other year because aging survey samples takes precedence over fishery samples in survey years. **The Team recommends that samples should be aged from the fishery every year.**
- Otoliths from surveys are not a random sample. **The Team recommends that surveys begin collecting random samples for aging.**

GOA Northern Rockfish

This assessment was an executive summary with updated projections and catches. The Teams accepted the methods and results.

GOA Shortraker Rockfish

Chris Lunsford gave a brief presentation on the shortraker rockfish assessment as part of a presentation of other rockfish species. This is a Tier 5 stock and there was no trawl survey this year, so there is a rollover of ABC (1,323 t) for the next two years. The catch (649 t) in 2014 was well below ABC (1,323 t). At this low level, there is not a big concern about harvest by management area for shortraker. The Western GOA rockfish fisheries did not open until October 15, but for shortraker that did not have an appreciable effect on catch. Next year, the authors will have new survey data and will produce a full assessment that will include exploration of the random effects model and other suggestions brought up at the September meeting.

In response to SSC and Team recommendations, the authors attempted to explore the overlap between the catch-in-areas and halibut fishery incidental catch estimation (HFICE) estimates. However, the HFICE authors recommended waiting for more years of the restructured observer program data so that a comparison between the two procedures can be made. Efforts are underway to determine the most appropriate approach for survey averaging for this species following the workgroup report and will be presented in the next full assessment. An appendix of "other" removals will be included in the next full assessment. Various approaches to calculate biomass based on the random effects model were presented to the Team in September 2013. Continued efforts are underway to determine the most appropriate approach for estimating biomass for this species and will be presented in the next full assessment. Authors continue to use status quo methods of area apportionments while the Plan Team's working group on survey averaging is evaluating alternative methods. Authors agree that the longline survey may provide a better abundance index for shortraker rockfish. Work continues to be done addressing this problem and will be included in the next full assessment. Ongoing efforts to validate current aging methodology continue, but no method has yet been approved.

GOA Dusky Rockfish

Chris Lunsford presented the GOA dusky rockfish stock assessment. This is an off-year assessment in which the projection model is run with updated catch information. In 2014, the directed fishery for rockfish in the Western GOA began on October 15, whereas in previous years directed fishing in the Western GOA occurred earlier in the summer. The stock assessment authors made appropriate adjustments in estimating the 2014 catch to account for the recent seasonal change in catch.

The authors note several modeling issues that will be examined in the 2015 full assessment, including: 1) setting the lower bound for the age-plus group; 2) computation of the age-error matrix; and 3) inclusion of the survey length composition data. The Team supports the planned work to address these issues.

GOA Rougheye and Blackspotted Rockfish

Dana Hanselman presented the assessment for the GOA rougheye complex. There were no changes to the model, but several changes to the data. The length-at-age, weight-at-age, and aging error matrix were all updated. The assessment now uses the Relative Population Numbers (RPNs) from the longline survey rather than the Relative Population Weights, which follows the practice in the sablefish assessment.

The 2013 bottom trawl survey biomass estimate was the lowest on record, and was decreased 37% from the 2011 survey estimate. However, the 2014 longline survey RPN value increased 40% from the 2013 value. Several changes to the longline survey were made, including new area estimates for the survey data and a full revision of longline survey estimates for rougheye/blackspotted rockfish.

Genetic studies were conducted during the bottom trawl surveys in 2009 and 2013 to examine the error rates in distinguishing blackspotted rockfish from rougheye rockfish. The error rate has declined to 13% in the 2013 study, with blackspotted rockfish generally identified correctly but some blackspotted rockfish being mis-identified as rougheye rockfish. The Team noted that it would be helpful to conduct a special project to assess whether the fishery disproportionately catches either of the two species.

Differences in life-history parameters, species distribution, and length distribution between the two species were presented. Rougheye rockfish have a higher von Bertalanffy *K* parameter than blackspotted rockfish. Rougheye rockfish have a broad length distribution, whereas the blackspotted rockfish length distribution consists primarily of larger fish, which may result from small blackspotted rockfish occurring in rocky habitats that are difficult to trawl. Blackspotted rockfish show higher trawl survey biomass estimates in the western GOA, whereas rougheye rockfish have higher abundances in the eastern GOA.

The current plus group of 25+ contains a high proportion of the age composition, particularly for the fishery. Additionally, the age composition data for the ages immediately preceding the plus group (i.e. ages 23 and 24) are consistently overestimated by the model, which likely reflects the age error being overestimated for the plus group. The assessment authors note that the choice of the plus group age, and the computation of the age error for the plus group, will be addressed in the 2015 assessment. The Plan Team supports the planned work to address these issues.

Three assessment models were evaluated. Model 0 is the last full assessment base model from 2011. Model 1 is an intermediate model which uses new and updated data but keeps the previous longline survey abundance index. Model 2 uses new and updated data, a new longline survey abundance index, and the updated conversion matrices.

The authors and Team recommend Model 2 for the 2014 assessment based on improved overall model fit to the data and the recommendation from the 2009 sablefish CIE to use the RPN index for the longline survey.

GOA Demersal Shelf Rockfish

Kristen Green (ADF&G) presented the Demersal Shelf Rockfish (DSR) assessment. The DSR assessment has incorporated density data for yelloweye rockfish from submersible surveys and subsequently remotely operated vehicle (ROV) surveys. Although the East Yakutat (EYKT) and Northern Southeast Outside (NSEO) regions were planned to be surveyed in 2014 (which would result in ROV data available for all DSR management areas in 2014), this was not possible due to weather. The authors noted that 2015 will be last year of State Funding for this survey project.

This year's assessment used updated average weight data and habitat area estimates. The authors removed old 1994 NSEO survey data and used 2012 CSEO as a proxy instead. Projected biomass of 10,933 t, new survey data and a decrease in average weights have influenced a new 2015 ABC of 225 t. This was reduced by 8 mt for subsistence yielding 217. In accordance with the State Board of Fisheries allocation directive, 182 t is allocated to commercial and 35 t to sport fishing.

Kray Van Kirk presented revisions to the draft age-structured assessment in SEO presented to the Team in September. Data, recruitment, M, survey data and CPUE data have changed since September. Earlier years of IPHC survey CPUE and directed commercial catch, and halibut fishery bycatch from fish tickets have been added. Survey density estimates that are used to scale the model to abundance are incomplete. IPHC survey age composition since 2008 was used. Estimates of M where age data are present is close to the prior mean of 0.02, while M values for the no-data period are approximately twice this value. Estimates of Z were generated from Catch-Curve from all ages all areas, and then these estimates used as a prior to partition F and M in the model. While creative, the Team thought this represented "double-dipping" of the data, since data used for the prior determination of Z are then used again in the model.

Since the survey used for this species discriminates between mature, sub-adult, and immature fish, the prior age-structured model had assumed that these proportions could be derived from the maturity at age curve. CPUE data from both commercial and IPHC survey data are now transformed differently and separated by area.

Results of this model show a strong recruitment signal in EYKT around age 20 that is not seen in other areas. Spawning biomass within SSEO is showing the largest decline among the three areas. Selectivity curves show that recruitment to the fishery occurs after sexual maturity.

There was some discussion about the possibility that some areas have higher harvest than others relative to the biomass estimates. Discussion revealed that the age error matrix provided to the authors was based on POP.

The Team recommends that an age error matrix for yelloweye rockfish be developed (perhaps using the software and methods provided by Punt et al. 2008[1]).

The Team supports the SSC recommendation to form a small, informal model-development working group.

The Team also recommends that the working group evaluate the feasibility of developing a southeast Alaska yelloweye/DSR age structured model and a GOA wide yelloweye/DSR age structured model.

GOA Thornyhead Rockfish

Chris Lunsford gave a brief presentation on the thornyhead rockfish assessment as part of a presentation on other rockfish species. This is a Tier 5 stock and there was no trawl survey this year, so there is a rollover of ABC for the next two years. The catch in 2014 was well below ABC. Next year, the authors will have new survey data and will produce a full assessment which will include exploration of the random effects model and other suggestions brought up at the September meeting. A member of the public asked whether the incidental catch of thornyheads would decline if the sablefish longline fishery in the GOA were to switch to pots. While there was not a definitive answer to this question at this time, Team members and the author surmised that the incidental catch of thornyheads would decline because they are not common in other pot fisheries. A Team member pointed out that there may be some data from British Columbia where there has been a long history of sablefish pot fishing.

The Team noted that for thornyheads (and a number of other species), it is critically important to the assessment that the GOA trawl surveys continue, and that survey depths extend to 1000 m in order to more completely cover rockfish habitat. Full stock assessment surveys have not been completed and usually the deepest stations are the ones that are not completed.

Development of ageing methods continues to be a research priority for shortspine thornyheads.

GOA Other Rockfish

Cindy Tribuzio presented an overview of the Other Rockfish update. There were no changes in assessment inputs or methodology since this was an off-cycle year. The estimated biomass of Other Rockfish of 83,383 t is based on an average from the three most recent GOA trawl surveys. The ABC of Other Rockfish was exceeded in the WGOA area in 2013. In response, the SSC combined the ABC for

[1] Punt, A.E., Smith, D.C., KrusicGolub, K., and Robertson, S. 2008. Quantifying age-reading error for use in fisheries stock assessments, with application to species in Australia's Southern and Eastern Scalefish and Shark Fishery. Can. J. Fish. Aquat. Sci. 65:1991-2005.

the Western and Central GOA for the 2014 and 2015 fisheries. The ABC in the combined Western/Central GOA management areas was not exceeded in 2014, as of November 8, 2014. However, the 2014 Other Rockfish catch was lower in the Western Gulf than previous years as the rockfish trawl fishery in this region was not opened to directed fishing in July, due to concerns of exceeding rockfish TACs. The Pacific ocean perch, northern rockfish, and dusky rockfish fisheries were subsequently opened to directed fishing on October 15, and the associated Other Rockfish catch in the Western/Central GOA management area is expected to increase as a result of those rockfish fishery openings. The authors noted that the combined 2014 Western/Central GOA Other Rockfish catch was the second highest since 2003.

In agreement with the SSC request, the Team recommends that a stock structure template be compiled for Other Rockfish.

The Team recommends that the assessment authors evaluate the IPHC survey data to look at the distribution of yelloweye/DSR in the Gulf of Alaska.

Jon Heifetz noted that yelloweye rockfish are very poorly assessed by the trawl survey and suggested looking in to Tier 6 options. Martin Dorn suggested evaluating other data poor options for assessments.

Concerns were expressed from the ADF&G biologist from PWS and Cook Inlet that yelloweye rockfish are being combined with "Other Rockfish" but the areas that are used to develop harvest levels are not areas that yelloweye inhabit. State biologists often mirror management actions by the Federal government on species that they assess. With new efforts to develop yelloweye assessments, the possibility that yelloweye is taken out of this aggregate exists.

GOA Atka Mackerel

Sandra Lowe presented the assessment update. Atka mackerel presence in the GOA remains primarily due to spillover of large year classes from the Aleutians. Catches, which are entirely bycatch in the GOA are down in 2014 (981 t) compared to 2013 (1,277 t) and occurred in the Shumagin and Chirikof areas. Age samples indicate that the 2006 and 2007 year classes dominate the bycatch data. The survey data reflect these dominant year classes as well, but also indicate a strong 2011 year class showing up. Maps showing the bottom trawl survey CPUE by station for 2011 and 2013 indicate a pattern of very few extremely large catches of Atka mackerel. Consistent with past years, OFL for Tier 6 is equal to average catch from 1978-1995 (6,200 t) and ABC (4,700 t) is defined as 75% of OFL. In the discussion, it was pointed out that the large 2006 and 2007 year classes are also dominating the catch in the Aleutians. It was also pointed out that a single (BSAI) stock has been suggested in the past as a management unit definition.

GOA Skates

For big skate catch estimates in the CGOA, the ABC was exceeded from 2010 to 2013, and in 2014, big skate was closed to retention early in the season in the CGOA, therefore the catch did not exceed the 2014 ABC. Catch estimates for longnose skates have exceeded the ABC in the WGOA four times since 2005 but these ABC's and catches are significantly lower than the CGOA.

Estimates of incidental catches increased substantially for longnose skates and "other skates" in 2013, mainly in the IFQ halibut target fishery. For longnose skates, most of the increased catch occurred in the EGOA. For "other skates" the increased catches occurred in the CGOA and EGOA. It is likely that this increased level of catch is due to the increased catch reporting from the halibut IFQ fishery as a result of increased observer coverage in 2013.

Currently, there are catch accounting issues with skates. Even though skates are a federally assessed and managed species, there have been problems incorporating skate catch information from the state waters. State waters catch information is available through the statewide catch accounting system but this

information has not been incorporated in the federal total catch information. State managers mirror federal management actions for skates in state waters and had assumed until last year that their catch information was included. State managers encourage that Federal catch accounting methods incorporate this information since skates are federally assessed and managed species.

There was significant discussion about how the random effect model should be used for skate biomass estimates for each area. The random effects model had results that fell between (mostly) the 3 year survey average and the biomass point estimate.

The Team recommended that the random effects model be used to estimate the gulf-wide ABC by species or species aggregate.

Also, the Team recommended that the apportionment be determined by the individual area random effects biomass estimates.

GOA Sculpins

Ingrid Spies presented the 2014 executive summary for the sculpin complex assessment. There were no clear trends in species abundance indices, and recent catches (2013 and 2014) are estimated to be far below the ABC levels. The 2013 aggregate survey biomass was slightly lower than 2011, and the 2014 biomass estimate is based on the 2013 estimate. There are no changes in OFL and ABC recommendations for 2015 and 2016.

The authors responded to a Team request to investigate whether species-specific ABC calculations could be compared with catch estimates. The authors calculated and presented a comparison of the proportion of plain, great, and bigmouth sculpin, and yellow Irish lord caught in the fishery versus the proportions present in the survey. The catch of the three sculpin species were below species-specific ABCs, while the catch of yellow Irish lord exceeded the species-specific ABC in 2013 and 2014. The latter species comprise the largest proportion of the sculpin complex.

The sculpin complex mortality rate is based on a biomass-weighted average of the instantaneous mortality rates for the four most abundant sculpins in the GOA; bigmouth, great, plain, and yellow Irish lord sculpins from the 2013 survey. As a result, the sculpin complex M was calculated as 0.222.

As requested by the Team in 2013, the author investigated the use of ABC-methods based on survey biomass-weighted M calculations for species complexes. This included using two alternative methods: 1) a strict average of species-specific M estimates for the complex, and 2) a biomass weighted M that includes biomass estimates for the entire biomass time series. The first alternative produced an M of 0.265, while the second produced an M of 0.221. The authors' preferred method uses the proportion of each species from the entire time series.

The author also examined, per the Team's request, the utility of using the random effects model for estimating survey biomass. This included two different approaches. The first included combining survey biomass and variance estimates for the four predominant sculpin species to input to the model, while the second included running the random effects model separately for each species and then combining the results. The two methods produced similar results. The first approach resulted in an estimated biomass of 32,744 t, while the second approach yielded an estimate of 32,614 t. These are comparable to the biomass estimate of 33,550 t, as derived from the standard method.

The Team recommended that the author use the random effects model to estimate sculpin biomass.

Finally, the author responded to Team comments regarding whether estimates of species-specific ABC calculations could be compared with catch estimates. The author calculated such estimates for plain, great, bigmouth sculpin, and yellow Irish lord. The catch of plain, great, and bigmouth sculpin were

below species-specific ABCs in 2012, 2013, and 2014. The catch of yellow Irish lord exceeded the species-specific ABC in 2013 and 2014.

The Team recommended that they apply species-specific Ms to respective biomass estimates (summed) for ABC and OFL calculations.

GOA Sharks

The 2014 Gulf of Alaska shark stock complex (consisting of spiny dogfish, Pacific sleeper shark, salmon shark, and other/unidentified sharks) assessment was presented by Cindy Tribuzio. The 2014 assessment is an executive summary, and incorporated updated catch data from 2013 and 2014. Assessment methodology was not changed.

Because of the uncertainty surrounding the data quality for these species, sharks are classified within Tier 6. The ABC and OFL for spiny dogfish are calculated using a Tier 5 approach. The complex OFL is based on the sum of the Tier 5 and Tier 6 recommendations for individual species. The 3-year average of biomass is used to assess spiny dogfish populations, while all other species have only average catch history data for such estimates. The most recent bottom trawl survey (in 2013) yielded similar biomass results as in 2007 for spiny dogfish, which were most abundant near Kodiak. With respect to the 2013 survey, sleeper sharks also were most abundant around Kodiak, and in general, their numbers increased slightly over recent years. Recent catch was much less than ABC or OFL, and it appears shark catch in the IFQ fishery has decreased relative to 2013.

The authors addressed various SSC and Team comments in the 2014 assessment. This includes a consideration of incorporating shark catch from areas 649 and 659 into the model. This is described in the Appendix presented at the September 2014 Team meeting, which is also incorporated into the shark assessment. Shark catch from these two areas will be incorporated into the next full assessment.

The authors noted that the implementation of the restructured observer program in 2013 increased the recent catch estimates for shark species, as smaller vessels and vessels fishing for halibut IFQ are now subject to observer coverage.

The Team discussed why it wasn't feasible to use HFICE in the assessment. Cindy noted that there are issues associated with double-counting shark catch if the HFICE data is used, including that the data cannot be incorporated into the NMFS catch accounting system. The Team noted that comparing the two data sources could provide a valuable means of catch reconstruction.

The Team recommended that the authors revisit the use of HFICE in 2016, once additional data area available from a longer time series (2013-2016).

Cindy also noted that the authors are investigating shark discard mortality rates. They have begun a literature review, with little information acquired so far. Limited research has been done on mortality of sharks caught in trawl gear. As sharks are caught predominantly with hook-and-line gear, mortality research specific to that gear type is necessary.

Research priorities

Additional research is needed on sleeper sharks. More data are needed about size at maturity and natural mortality. The authors also noted the need for better aging methodology for sharks. In the future, it may be possible to collect improved age data from the "large" sleeper sharks that the authors believe are caught in IPHC surveys, so access to those animals could enhance size and maturity data.

GOA Squids

Olav Ormseth presented the assessment of the squid complex in the Gulf of Alaska. This assessment was an executive summary with updated catches. The Team concurred with the author to continue to set catch limits for squid based on Tier 6. Consistent with past years, OFL for tier 6 is equal to maximum catch from 1977-2007 (1.530 t) and ABC (1,148 t) is defined as 75% of OFL. In the discussion, it was pointed out by the author that squid could be reclassified as an Ecosystem Component (EC). The Team discussion focused on whether GOA squid meet the definition of an EC. A substantial proportion of squid are retained for sale as bait or for human consumption. Thus it is uncertain whether squid meet the definition of EC.

GOA Octopus

The author was unavailable to present the results of the octopus assessment so it was presented by Olav Ormseth. For management purposes, all octopus species are grouped into a single assemblage. The author is trying to develop a size-based assessment for octopus which she will bring forward next September. Catch limits for octopus for 2011-2014 were set under Tier 6 with an alternative method based on using the average of the last 3 surveys as a minimum biomass estimate. This method will continue to be used in 2015 – 2016.

The estimated state and federal catch has increased the last 4 seasons, from 2011-2014 with the catch in 2014 at 709 tons. Octopus is caught incidentally to other fisheries; the Pacific cod fishery caught 83% of the octopus in 2014.

There are no new biomass estimates for this year. While much information is carried over from the previous assessment, the only change this year is the inclusion of updated catch information.

The Team continues to recommend that a stock structure template be completed by next September.